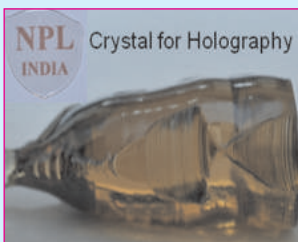
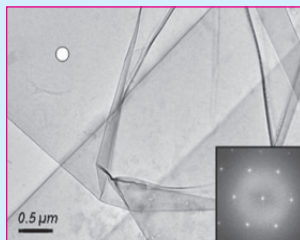


S & T Achievements



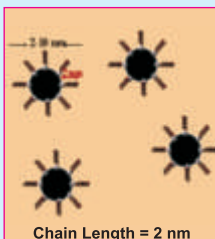
Fe-doped Lithium Niobate Single Crystal



Single layer graphene sheet synthesized by Re-exfoliation of expanded graphite



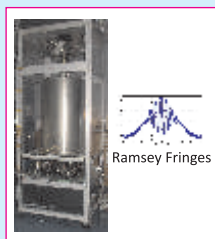
350W PEM Fuel cell stack using NPL porous carbon paper and bipolar plates



Ferrodiluids particle (5-15 nm)



Red Green & Blue Up conversion Phosphors under IR excitation



The Fountain Clock



Composite ECG

Integrated efforts for efficient energy harvesting technologies

CSIR-NPL is moving in a focused and vibrant R&D mode towards the development of cost effective, efficient and stable technologies by harvesting solar energy. It includes the development of solar cell based on c-Si, a-Si, thin films, polymer and hybrid nano-structured materials and thermoelectric materials, etc.

Advanced Research Tools

3D Optical Profiler	Secondary Ion Mass Spectrometer
Atomic Force Microscope	Spectroscopic Ellipsometer
FTIR Spectrophotometer	Stylus Based Surface Profiler
FTIR with Raman Accessory	X and Q Band EPR Spectrometer
High Resolution Transmission Electron Microscope	X-Ray Diffractometer
High Resolution X-Ray Diffractometer	X-Ray Florescence Spectrometer
Ion Chromatograph	Scanning Tunneling Microscope
Laser Raman Spectrometer	Multi-Probe Surface Analysis System
OC/EC Analyzer	Molecular Beam Epitaxy System
Particle Size Analyzer	Multi-Probe Surface Analysis System
Physical Property Measurement System	Spark Plasma Sintering System
Variable Pressure SEM & EDS System	Inductively Coupled Plasma-High Resolution Mass Spectrometry

*For general enquiries, contact :
Director*

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NPL at a GLANCE



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NATIONAL PHYSICAL LABORATORY
(Council of Scientific & Industrial Research)
NEW DELHI - 110 012



NPL - An Important Member of the CSIR Family



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President CSIR



Shri Vilasrao Deshmukh
Minister of Science &
Technology
Minister of Earth
Sciences
Vice President, CSIR



Prof. Samir K. Brahmachari
Director General, CSIR



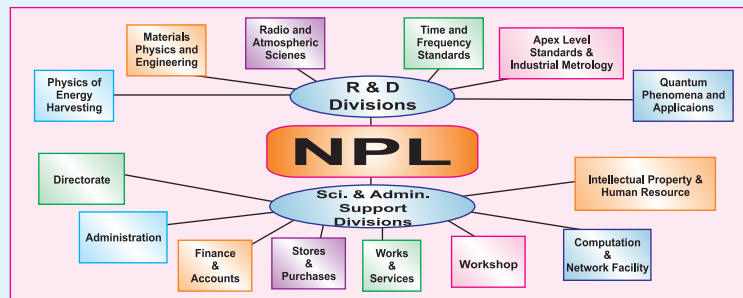
Prof. Ramesh Chandra Budhani
Director, NPL

The National Physical Laboratory is one of the earliest national laboratories set up under the Council of Scientific & Industrial Research. Late Shri Jawaharlal Nehru laid the foundation stone of NPL on 4th January 1947. The main building of the laboratory was formally opened by Late Deputy Prime Minister, Sardar Vallabhbhai Patel, on 21st January 1950. Late Dr. K. S. Krishnan, FRS, was the first Director of the laboratory.

Mandate:

The main aim of the laboratory is to strengthen and advance physics-based research and development for the overall development of science and technology in the country. In particular its objectives are:

- To establish, maintain and improve continuously by research, for the benefit of the nation, National Standards of Measurements and to realize the Units based on International System
- To identify and conduct, after due consideration, research in areas of physics which are most appropriate to the needs of the nation and for advancement of the field
- To assist industries, national and other agencies in their developmental tasks by precision measurements, calibration, development of devices,



Major Research Areas

Metrology:

Realization of Base & Derived Units.
Apex Level Calibration of Physico-mechanical and Electrical & Electronic Standards.
Chemical Metrology including CRM's.

Materials:

Light weight, high strength metallic materials & composites
Advanced Carbon Products
Cryogenics, Superconductivity and Superconducting Devices
Conducting Polymers & Composites
Organic Electronic-OLEDs & OPEVs
Liquid Crystals & Display Devices
Luminescent Materials
Nano materials including nano-composites
Photovoltaics
Sensors (Bio, Gas, Chemical & MEMS)
Advanced Characterization

Radio & Atmospheric Sciences

Ionosphere & Troposphere
Antarctica & Arctic Studies
Communication (Mobile)

Global Climate Change
Radio Propagation

State of the Art Facility



Advanced Pressure Measurement System



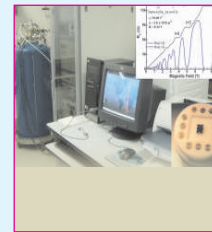
50 kg Mass Comparator with Readability 0.1 mg



One-Mega-Newton Force Standard machine



Physical Property Measurement System



Quantum Hall Resistance Standard



Spark Plasma Sintering Unit (SPS) & (a) inset showing the die in hot condition during sintering



Analytical High Resolution Transmission Electron Microscope



X- and Q- band EPR Spectrometer



Digital Ionosonde System, installed at Maitri, Antarctica



Primary Ozone Standard facility



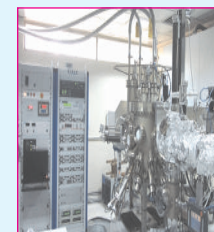
Variable Pressure SEM & EDS System



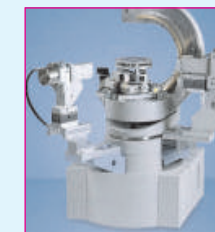
Focused Ion Beam System



Inductively Coupled Plasma-High Resolution Mass Spectrometry



Molecular Beam Epitaxy System



High Resolution XRD System



Multi-Probe Surface Analysis System

Custodian of National Standards of Measurement : Traceable to International Standards

Realization of SI Units		
Quantity (Unit)	Standard	Uncertainty (k=2)
Length (m)	Iodine Stabilized He-Ne laser	4.2×10^{-11}
Mass (kg)	1 kg International Prototype	1×10^{-8}
Time (s)	Cesium Atomic Clock	1×10^{-13}
Electric Current (A)	Realized through Voltage & Resistance	2×10^{-6}
Temperature (K)	Triple Point of Water	1.7×10^{-4}
Luminous Intensity (cd)	A Set of Standard Lamps	$(1.6-1.3) \times 10^{-2}$